Session 4: Regional Precipitation

Summary Remarks

Angie Pendergrass and Vijay Tallapragada

Thanks to Huanping Huang for taking notes

Session 4: Regional Precipitation

Focus Areas:

- Regional aspects of precipitation prediction challenges
- Emphasis on gaps in our observing systems
- Representation of key physical processes in the numerical prediction models for capturing severe weather events, their climatology, and variability

Keynote Speaker: Dave Novak (NOAA/NCEP/WPC)

Panelists: Lynn McMurdie, U.Washington, Marty Ralph, CW3E, Anita Rapp, Texas A&M and Johanna Infanti, NOAA/CPC

Keynote Presentation by Dave Novak

- **Operational forecasting of precipitation with emphasis on regional aspects**
- Precipitation skill, while slowly improving, is lagging other forecast metrics
- Forecast process is complicated due to various types of precipitation hazards for different regions
- High resolution models and ensembles are still far from accurately predicting the location and magnitude of precipitation, particularly associated with Mesoscale Convective Systems.
- Initiation of convection, non-physical propagation of convection and phase speed of troughs are major concerns along with under-dispersive and thus overconfident ensembles.

Panel Remarks by Lynn McMurdie

- **Pacific Northwest Precipitation and Snowstorms as Seen in the Field**
- Provided details on results from two field campaigns - the recent OLYMPEX, which focused on orographic precipitation in the Pacific Northwest, and, the ongoing IMPACTS, which focuses on east coast snow storms.
- Highlighted the importance of accurate representation of warm rain processes and orographic influences, especially in the microphysics schemes currently available for NWP.

Panel Remarks by Marty Ralph

- **Atmospheric Rivers and Their Impact on Precipitation Forecasts in the West Coast**
- Highlighted the importance of ARs on West Coast precipitation.
- Emphasized the need for regional modeling efforts tailored to specific issues associated with ARs.
- AR Recon Field measurements enabled much needed data for initialization of operational models and also associated research activities.

Panel Remarks by Anita Rapp

- **Observational Perspectives, Including the Upcoming TRACER Campaign**
- Uncertainties involving aerosol interactions and coupled convective dynamical and microphysical processes.
- Highlighted some of the issues that detailed observations can reveal about these uncertainties.

Panel Remarks by Johnna Infanti

- **Model biases in the southeastern US precipitation**
- Highlighted the seasonal aspects of southeastern precipitation forecasts impacted by model biases in ENSO, AO and other low frequency modes of variability which are relevant to seasonal timescale prediction,
- Highlighted that many aspects of the problem that would improve predictions for the southeast could also improve prediction across timescales and have relevance in other regions as well.

Panel Discussion and Q&A:

Discussion Topics:

- **Key aspects of the regional precipitation modeling and forecast challenges**
- Improving microphysics parameterizations & Stochastic physics
- Need for high resolution regional models while continue improving global models
- Unified modeling approach vs. regionally perfected solutions,
- Developing partnerships with observational, modeling, and forecast communities
- Future observing strategies including satellite based hyperspectral instruments to fill the observational gaps.
- Observations in the PBL are especially the biggest gap and hold key for improving model physics.
- Accurate representation of the phenomena is critical in order to get the precipitation predictions right.